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ABSTRACT

This study attempted to determine whether the findings of psycholinguists to syntax and reading comprehension could be generalized to children of other English-speaking cultures. Specifically, the influence of material written at different levels of syntactic maturity (according to the T-unit analysis) upon the reading comprehension of selected Australian fourth graders was determined. The findings underline the need for caution in generalizing American research findings to other English-speaking cultures and for further studies of language development of children from other English-speaking cultures. (Author/RB)

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The Generalization of Psycholinguistic Research to Other English Speaking Cultures

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Recently this author has grown increasingly aware of the contributions of the psycholinguists to reading theory. Notable among these contributions has been the study of the development of syntactic maturity among children and its effects upon reading comprehension.

In recent years, studies of syntactic development and readability have been greatly influenced by the work of Hunt (2), (3) and O'Donnell, Griffin and Norris (5). Stemming from their analyses of the written language of children and adults at various age levels has been the development of new, more precise and objective techniques for the measurement of syntactic complexity. Most notable among these indices are the T-unit index and clause length. The T-unit index, in short, is based on the notion of the minimal terminal unit which has been defined as one main clause plus whatever subordinate clauses are attached to it or embedded within it.

Given these indices of Hunt et al., and by developing passages which reflect these varying levels of syntactic complexity it has been possible for researchers to direct attention to a study of the effects of a single variable, syntax, upon reading comprehension. Using multiple grade levels and the syntactic characteristics of children and adults at various grade levels as identified by Hunt, Smith (7) undertook such an investigation. Specifically, Smith attempted to determine whether more mature syntactic structures increased reading difficulty, or whether students irrespective of their grade level read with equal facility material at different levels of syntactic complexity. By keeping all the syntactic characteristics as close as possible to the means of Hunt's (3) data and by holding vocabulary, content and sentence length constant, Smith developed paragraphs around two themes with the syntax of Hunt's "typical" fourth-graders, eighth-graders, twelfth-graders and skilled adults. Cloze passages were then

formed by an "every-fifth word" deletion schedule and these were administered to a total of 1080 subjects from grades 4 through 12. The results of Smith's study revealed that while older students read all levels of writing significantly better than did younger students, fourth-graders read fourth grade writing best and eleventh graders read the fourth grade writing with least facility. He concluded, therefore, that while his study offered no definite conclusion relative to the relationship between syntax and reading comprehension, there were indications "that the productive level may determine the best receptive level." This finding appears to be supported by other studies. Using the high and low frequency oral language patterns identified by Strickland (8), Ruddell (6) found among fourth-graders significantly higher reading comprehension scores on passages which contained high frequency patterns than passages which contained low frequency patterns. Also Tatham (9) reached the same conclusion about the reading comprehension of both second and fourth-graders.

Optimistically one might conclude that the typical syntactic characteristics of children at various grade levels have and can be analyzed and that this single variable, syntax, has an effect upon reading comprehension. Moreover, the validity of these findings suggeststhat the gap between the child's linguistic experience and the literary task may be drawn nearer to a close. This gap as Downing (1) points out may cause "increased cognitive confusion" and can result in delay of literacy development or "even out right failure."

Various cultures, especially those which are of English speaking origin, are apt to adopt American research findings without prior investigation. It should be noted that the validity of these findings discussed herein has not been determined for other linguistic environments. Indeed, prior to transplanting these findings to incompatible cultures, objective evidence relative to the validity of psycholinguistic findings should be sought.

The purpose of the present study was to obtain, via the comparative method, objective evidence as to the validity of the psycholinguists relative to the effect of syntax upon reading comprehension. In this regard, the validity of the findings relative to the influence of material written at different "typical" levels of syntactical complexity upon the reading comprehension of fourth-graders from another English speaking country was determined. For this purpose, the facility with which Australian fourth-graders could comprehend the syntactic structures identified by Hunt as "typical" of fourth-graders, eight-graders, twelfth-graders and skilled adults was ascertained, examined and compared with that of American pupils.

Hypotheses

The hypotheses to be tested were:

1. There would be no significant difference in the means between the Australian fourth-graders' reading comprehension scores on the cloze passages written at the four levels of syntactic complexity.
2. There would be no significant difference in the means between the Australian fourth-graders' reading comprehension scores and the American fourth-graders' reading comprehension scores on the cloze passages written at either the fourth grade, eighth grade, twelfth grade or skilled adult level of syntactic complexity.

Procedures

The test instrument was one of two developed by Smith for the purposes of his previously cited study. This instrument consisted of four passages which represented the syntactic characteristics "typical" of fourth-graders, eighth-graders, twelfth-graders and skilled adults. As stated previously, the syntactic characteristics regarded as "typical" were based on data from Hunt's study (3)

in which students from grades four, six, eight, ten and twelve were asked to rewrite a passage presented in the form of kernel sentences. The syntactic characteristics of these passages are presented in Table 1. A copy of these passages is available in the appendix. From the passages which had been written, cloze passages were formed by using an "every-fifth word" deletion schedule. It should be noted that Smith used a different method of deletion in that he used every possible sequence of "every-fifth word" deletion schedule.

Table 1

Measurements of the Syntactic Characteristics

of the Instrument

Syntactic Characteristics	4	8	12	Adult
Words per Clause	5.95	7.71	9.64	12.43
Clauses per T-Unit	1.05	1.56	1.38	1.40
Words per T-Unit	6.24	12.00	13.25	17.40
Coordinated Main Clauses	14	3	2	0
Coordinated Predicates	1	0	2	0
Less than Predicate	1	10	11	17
Less than Clause	2	10	13	17
Subordinate Clauses	1	5	3	2
Words per Sentence	18.81	18.00	17.66	17.44

Australia was selected as a suitable source of subjects as it represented a country of English speaking origin which was accessible to the researcher. Fourth grade was selected as the single grade level most suitable as it was equatable with the grade level used in various past studies (Smith, Ruddell and Tatham). The subjects consisted of 72 students who were selected from a fourth grade population enrolled in the Illawarra School District, New South Wales, Australia. The students were exclusively white and largely from middle class backgrounds.

In July, 1973, teachers within the system asked each student to read one of the four passages to which he had been randomly assigned. No explanations, assistance or reinforcement were given during testing and students were allowed as much time as required to complete their passages. The investigator determined the percentage correct for each individual and transformed each percentage by an arc sine transformation. A one-way analysis of variance was employed for the purpose of testing the significance of the differences between the means of the four groups and t-tests were employed to compare the means of Australian and American subjects on each of these passages.

Results

In accordance with the first objective, the hypothesis was: there would be no significant difference in the population means between fourth-graders' reading comprehension scores on the cloze passages written at four levels of syntactic complexity.

Table II presents a summary of the sample size, mean percentages, standard deviations and standard errors of the means for the four groups of Australian pupils on the cloze passages. All scores are expressed in terms of percentages. The mean differences in the comprehension scores favored the fourth grade level passages: by approximately 2.5 percentage points over the mean scores on the skilled adult level passages; by approximately 6.4 percentage points over the mean score on the eighth grade level passages; and by approximately 4.5 percentage points over the mean score on the twelfth grade level passages.

Table II

Group Sizes, Mean Percentages and Standard Deviations, Standard Errors of the Means on the Four Levels of Syntactic Complexity

Level of Syntactic Complexity	Group Size	Standard Deviation	SE_m	Mean
4	18	12.4	2.91	40.81
8	18	11.6	2.74	34.39
12	18	14.5	3.42	36.24
Adult	18	17.2	4.07	38.28

Table III summarises the analysis of variance for the Australian pupils' reading comprehension on the passages written at four levels of syntactic complexity. There was no significant difference in the means between the reading comprehension scores on the four levels of syntactic complexity.

Table III

Summary of Analyses of Variance for the Four Levels of Syntactic Complexity

Source	df	MS	F
Syntactic Complexity	3	.06313	.6873
Error	68	.03171	

The second hypothesis of this investigation was that there would be no significant difference in the means between the Australian fourth-graders' reading comprehension scores and the American fourth-graders' reading comprehension scores on the cloze passages written at either the fourth grade, eighth grade, twelfth grade or skilled adult level of syntactic complexity.

Table IV summarises the results of Smith's study relative to the American fourth-graders performance on these passages. In Table V, the results of the comparison between the Australian and American pupils' reading comprehension scores is reported. There was no significant difference in the means between the Australian and American pupils on either the eighth grade, twelfth grade or skilled adult passage. Significant differences ($p < .10$) occurred between the Australian and American pupils on the fourth grade passages.

Table IV

Smith's Study

Group Sizes, Mean Percentages and Standard Deviations, Standard Errors of the Means on the Four Levels of Syntactic Complexity

Level of Syntactic Complexity	Group Size	Standard Deviation	SE_m	Mean
4	30	16.1	2.94	47.4
8	30	18.8	3.43	35.4
12	30	18.1	3.31	39.2
Adult	30	18.8	3.43	33.5

Table V

Comparison of Australian and American Pupil's Reading Comprehension on the Four Levels of Syntactic Complexity

Level of Syntactic Complexity	t	Significance
4	1.59	P .10
8	.23	N.S.
12	.62	N.S.
Adult	.90	N.S.

Discussion

Relative to the particular subjects used and the methods employed, the results of this investigation indicated that there was no significant difference ($P < .05$) between the reading comprehension scores on the four passages written at different levels of syntactic complexity. This finding appears to be in disagreement with the findings of Smith (7) and possibly Ruddell (6) and Tatham (9). When comparing the data from the present study with the data of Smith's study, no significant differences ($P < .10$) were found between the reading comprehension scores of the Australian subjects and the American subjects on passages written at the "typical" eighth grade, twelfth grade and skilled adult level. However, differences, which were significant ($P < .10$) were found between the Australian and American subjects on passages written at the "typical" fourth grade level.

Several explanations seem plausible:

1. The syntactic characteristics as identified by Hunt and incorporated by Smith may not represent the "typical" syntactic structures of Australian children. Thus, the T-unit index and clause length may lack utility as indices across cultures.
2. The findings of Smith and others relative to the influence of syntax upon reading comprehension may lack validity for the population of Australians represented in the present study.
3. The findings of the present study may have arisen purely by chance or may be a function of differences in instrumentation and administration.

Disregarding the latter explanation, it seems feasible to assume that environmental differences unique to the subjects of the present study account for these results. Thereupon, the present study underlines the need for further information about the

linguistic characteristics of children from Australia and other cultures which are apt to apply American research findings without adequate investigation. If perhaps the productive level of children of different syntactic levels of writing is related to the receptive level, the productive levels of children from these cultures need to be identified and compared. Indeed, further research is needed into both the production and reception of syntax within various linguistic environments prior to the generalization of psycholinguistic findings relative to the effect of syntax upon reading comprehension. Hopefully the present study will stimulate further psycholinguistic studies across nations. Then, when the findings of psycholinguists from various nations are obtained and synthesized, viable generalizations can be made. As Malinowski (4) stated: "the comparative method must remain the basis of any generalization, any theoretical principle or any universal law applicable to our subject matter."

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Appendix

BEE GLOW

Fourth Grade Level of Writing

The bee protects his family. He uses his stinger, and he stings his enemies. The stinger has hooks on it, and it contains poison. The bee pushes the stinger into the skin, and the hooks dig into the skin, and when the bee flies away, the hooks hold tight, and the stinger pulls out of the bee. Muscles are in the stinger, and they are little, and they move and push the stinger, and the stinger goes deeper into the skin and the muscles squeeze the poison out. The sting causes pain, and the pain is sudden and the poison causes the skin to swell. The stinger should be scratched off quickly, and then not much poison gets into the skin, and the pain is less, and the swelling is less.

BEE GLOW

Eighth Grade Level of Writing

The bee protects his family by stinging his enemies with his poisonous stinger which has hooks on it. As the bee pushes the stinger into the skin, the hooks dig into the skin, and when the bee flies away, the tightly holding hooks pull the stinger out of the bee. The little muscles in the stinger move, pushing the stinger which goes deeper into the skin. The muscles then squeeze the poison out. The stinger causes a sudden pain, and the poison causes the skin to swell. If the stinger is scratched off quickly, not much poison gets into the skin, and the pain and swelling are less.

BEE GLOW

Twelfth Grade Level of Writing

The bee stings his enemies with his stinger in order to protect his family. The poisonous stinger is pushed into the skin. The hooks on the stinger dig into

the skin and hold tight so that the stinger pulls out of the bee when he flies away. The movements of the little muscles in the stinger push it deeper into the skin and squeeze the poison out. The sting causes a sudden pain, and the poison causes a swelling of the skin. The pain and the swelling are lessened if the stinger is scratched off quickly, for not as much poison gets into the skin.

BEE GLOW

Skilled Adult Level of Writing

The bee protects his family by stinging his enemies with his poisonous, hooked stinger. The stinger, when pushed into the skin, causes a sudden pain. The hooks dig into the skin, so as to hold the stinger tight and pull it out of the bee as he flies away. The little muscles in the stinger move, pushing it deeper into the skin and squeezing out the poison, which causes the skin to swell. If the stinger is scratched off quickly, less poison gets into the skin, thus lessening the pain and swelling.